

IN THE CLAIMS

1. (Currently Amended) A method, comprising:
calculating, by a device that shares one or more upstream channels with other devices,
an available bandwidth of a first upstream channel based at least on upstream
channel bandwidth data transmitted from a remote system;
~~determining, by a device that shares an upstream channel with other devices~~ by the
device, whether based, at least in part on particular data, an upstream channel
data transfer rate can be improved over a current data transfer rate of the first
upstream channel ~~a current upstream channel~~ from the device to [[a]]the
remote system, wherein the particular data comprise the device's transmit
queue capacity data, the upstream channel bandwidth data transmitted from the
remote system, or both; and
improving by the device, if the upstream channel data transfer rate can be improved,
the upstream channel data transfer rate based, at least in part, on the particular
data[[,]]
~~wherein the particular data comprise the device's transmit queue capacity data,~~
~~upstream channel bandwidth data transmitted from the remote system, or both.~~
2. (Currently Amended) The method of claim 1, wherein the device that shares the one or
more upstream channels with other devices comprises a cable modem.
3. (Original) The method of claim 2, wherein the remote system comprises a cable
modem termination system (CMTS).

4. (Canceled)
5. (Previously presented) The method of claim 3, wherein determining whether the upstream channel data transfer rate can be improved comprises determining whether the transmit queue capacity data indicates that the transmit queue is full.
6. (Original) The method of claim 5, wherein improving by the cable modem the upstream channel data transfer rate based, at least in part, on the particular data comprises:
 - if the transmit queue capacity data indicates that the transmit queue is full:
 - determining whether a capacity of the transmit queue is at a maximum capacity; and
 - increasing the capacity of the transmit queue, if the capacity is not at the maximum capacity.
7. (Original) The method of claim 5, wherein improving by the cable modem the upstream channel data transfer rate based, at least in part, on the particular data comprises:
 - if the transmit queue capacity data indicates that the transmit queue is full:
 - determining whether a capacity of the transmit queue is at a maximum capacity; and
 - initiating a service flow, if the capacity of the transmit queue is at the maximum capacity.
8. (Canceled).
9. (Previously presented) The method of claim 3, wherein the bandwidth data comprises an upstream channel descriptor (UCD) message and an upstream bandwidth allocation map (MAP) message.

10. (Currently Amended) The method of claim 9, wherein determining whether the upstream channel data transfer rate can be improved comprises:

performing by the cable modem, operations of

receiving the UCD message from the CMTS for each upstream channel, including the ~~current~~ first upstream channel the cable modem is using;

receiving the MAP message from the CMTS for each upstream channel;

calculating an available bandwidth of each upstream channel based, at least in part, on the UCD message and the MAP message; and

determining whether a different upstream channel has more bandwidth than the ~~current~~ first upstream channel.

11. (Currently Amended) The method of claim 10, wherein improving by the cable modem the upstream channel data transfer rate based, at least in part, on the particular data comprises switching to the different upstream channel, if the different upstream channel has more available bandwidth than the ~~current~~ first upstream channel.

12. (Currently Amended) An article of manufacture comprising:

a machine-accessible medium including thereon sequences of instructions that, when executed, cause a device that shares ~~[[an]]~~ one or more upstream channels with other devices to:

calculate an available bandwidth of a first upstream channel based at least on upstream channel bandwidth data transmitted from a remote system;

determine whether based, at least in part on particular data, an upstream channel data transfer rate can be improved over a current data transfer rate of ~~a current~~ the first upstream channel from the device to ~~[[a]]~~ the remote system, wherein the particular data comprise the device's transmit queue capacity data, the

upstream channel bandwidth data transmitted from the remote system, or both;

and

improve, if the upstream channel data transfer rate can be improved, the upstream

channel data transfer rate based, at least in part, on the particular data[[,]]

~~wherein the particular data comprise the device's transmit queue capacity data,~~

~~upstream channel bandwidth data transmitted from the remote system, or both.~~

13. (Currently Amended) The article of manufacture of claim 12, wherein the device that shares the one or more upstream channels with other devices comprises a cable modem.

14. (Original) The article of manufacture of claim 13, wherein the remote system comprises a cable modem termination system (CMTS).

15. (Canceled)

16. (Previously presented) The article of manufacture of claim 14, wherein the sequences of instructions that, when executed, cause the device to determine whether the upstream channel data transfer rate can be improved comprise sequences of instructions that, when executed, cause the device to determine whether the transmit queue capacity data indicates that the transmit queue is full.

17. (Original) The article of manufacture of claim 16, wherein the sequences of instructions that, when executed, cause the device to improve by the device the upstream channel data transfer rate based, at least in part, on the particular data comprise sequences of instructions that, when executed, cause the device to:

if the transmit queue capacity data indicates that the transmit queue is full:

determine whether a capacity of the transmit queue is at a maximum capacity; and

increase the capacity of the transmit queue, if the capacity is not at the maximum capacity.

18. (Original) The article of manufacture of claim 16, wherein the sequences of instructions that, when executed, cause the device to improve by the device the upstream channel data transfer rate based, at least in part, on the particular data comprise sequences of instructions that, when executed, cause the device to:

if the transmit queue capacity data indicates that the transmit queue is full:
determine whether a capacity of the transmit queue is at a maximum capacity; and
initiate a service flow, if the capacity of the transmit queue is at the maximum capacity.

19. (Canceled)

20. (Previously presented) The article of manufacture of claim 14, wherein the bandwidth data comprises an upstream channel descriptor (UCD) message and an upstream bandwidth allocation map (MAP) message.

21. (Currently Amended) The article of manufacture of claim 16, wherein the sequences of instructions that, when executed, cause the device to determine whether the upstream channel data transfer rate can be improved comprise sequences of instructions that, when executed, cause the device to:

receive the UCD message from the CMTS for each upstream channel, including the ~~current~~first upstream channel the cable modem is using;
receive the MAP message from the CMTS for each upstream channel;
calculate an available bandwidth of each upstream channel based, at least in part, on the UCD message and the MAP message; and

determine whether a different channel has more bandwidth than the ~~current~~ first upstream channel.

22. (Currently Amended) The article of manufacture of claim 21, wherein the sequences of instructions that, when executed, cause the device to improve the upstream channel data transfer rate based, at least in part, on the particular data comprise sequences of instructions that, when executed, cause the device to switch to the different upstream channel, if the different upstream channel has more available bandwidth than the ~~current~~ first upstream channel.

23. (Currently Amended) An apparatus, comprising:
an improvement determination unit (IDU),

to calculate an available bandwidth of a first upstream channel based at least on upstream channel bandwidth data transmitted from a remote system;
and

to determine, based at least in part on particular data, whether an upstream channel data transfer rate can be improved over a current data transfer rate of a ~~current upstream channel~~ the first upstream channel to [[a]]the remote system, wherein the particular data comprise the apparatus's transmit queue capacity data, the upstream channel bandwidth data transmitted from the remote system, or both; and

an improvement unit, coupled with the IDU, to improve, if the upstream channel data transfer rate can be improved, the upstream channel data transfer rate based, at least in part, on the particular data[[,]]

~~wherein the particular data comprise the device's transmit queue capacity data, upstream channel bandwidth data transmitted from the remote system, or both.~~

24. (Currently Amended) The apparatus of claim 23, wherein the apparatus comprises a cable modem~~particular data comprises cable modem transmit queue capacity data.~~

25. (Currently Amended) The apparatus of claim 24, wherein the remote system comprises a cable modem termination system (CMTS)~~particular data comprises upstream channel bandwidth data transmitted from the CMTS.~~

26. (Currently Amended) A system, comprising:

- a cable modem termination system, to transmit and receive data packets;
- customer premise equipment (CPE), to receive the data packets from [[the]]cable modem termination system (CMTS) [[CMTS]]and transmit the data packets to the CMTS;
- a cable modem, coupled with the CMTS and the CPE, to
 - determine whether, based at least in part on particular data, an upstream channel data transfer rate can be improved over a current data transfer rate of ~~a current upstream channel~~ the first upstream channel from the cable modem to the CMTS, wherein the particular data comprise the device's transmit queue capacity data, the upstream channel bandwidth data transmitted from the remote system, or both; and
 - improve, if the upstream channel data rate can be improved, the upstream channel data transfer rate based, at least in part, on the particular data;
 - and
- a coaxial cable, to couple the cable modem with the CMTS and transmit the data packets between the cable modem and the CMTS~~[[,]]~~

~~wherein the particular data comprise the device's transmit queue capacity data, upstream channel bandwidth data transmitted from the remote system, or both.~~

27. (Original) The system of claim 26, wherein the cable modem is integrated with the CPE.

28. (Canceled)

29. (Canceled)

30. (New) The method of claim 3, wherein determining whether the transmit queue capacity data indicates that the transmit queue is full comprises:

monitoring a first number of receipt failure indicators transmitted from the CMTS;
comparing the first number of receipt failure indicators to a second number; and
indicating the transmit queue is full if the first number is larger than the second number.

31. (New) The method of claim 9, further comprising performing by the cable modem operations of

receiving the UCD message and the MAP message from the CMTS; and
calculating an available bandwidth associated with each at least upstream channels respectively.

32. (New) The method of claim 9, further comprising performing by the cable modem operations of

calculating empty time-slots of each upstream channel of the one or more upstream channels; and
calculating an available bandwidth of each upstream channel based at least in part on the numbers of empty time-slots.